

AMENDMENTS TO THE CLAIMS

The following set of claims replaces all previous versions of claims:

Listing of Claims

1-105. (Cancelled)

106. (Currently amended) An isolated recombinant protein comprising a variant form of SEQ ID NO:38, said variant form having no more than 29 amino acids other than position 214 of SEQ ID NO:38 which are different from the amino acid sequence set forth in SEQ ID NO:38, and wherein the recombinant protein comprises a variant form of SEQ ID NO:41 wherein said variant form comprises no more than 27 amino acids other than positions 214, 232 and 354 of SEQ ID NO:41 which are different from the amino acid sequence set forth in SEQ ID NO:41, and wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

107. (Previously presented) The recombinant protein of claim 106, wherein Xaa in SEQ ID NO:38 is an amino acid selected from the group consisting of Cys, Ala and Asn.

108. (Previously presented) The recombinant protein of claim 106, wherein Xaa in SEQ ID NO:38 is Ala.

109. (Previously presented) The recombinant protein of claim 106, wherein the recombinant protein comprises a variant form of SEQ ID NO:40 wherein said variant form comprises no more than 28 amino acids other than positions 214 and 354 of SEQ ID NO:40 which are different from the amino acid sequence set forth in SEQ ID NO:40.

110.-111 (Cancelled)

112. (Previously presented) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 106.

113. (Previously presented) A vector comprising the nucleic acid sequence according to claim 112.

114. (Previously presented) An isolated cell transformed with the vector according to claim 113.

115. (Previously presented) The cell according to claim 114 which is a prokaryotic cell.

116. (Previously presented) The cell according to claim 114 which is a plant cell.

117. (Previously presented) A plant comprising the cell according to claim 116.

118. (Previously presented) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 106 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

119. (Previously presented) A kit comprising the protein according to claim 106.

120. (Previously presented) The kit according to claim 119 which further comprises luciferin.

121-124. (Cancelled)

125. (Previously presented) An isolated recombinant protein comprising SEQ ID NO:41, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

126. (Previously presented) An isolated recombinant protein comprising SEQ ID NO:42, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

127-128. (Cancelled)

129. (Previously presented) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 125.

130. (Previously presented) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 126.

131-132. (Cancelled)

133. (Previously presented) A vector comprising the nucleic acid sequence according to claim 129.

134. (Previously presented) A vector comprising the nucleic acid sequence according to claim 130.

135-136. (Cancelled)

137. (Previously presented) An isolated cell transformed with the vector according to claim 133.

138. (Previously presented) An isolated cell transformed with the vector according to claim 134.

139-140. (Cancelled)

141. (Previously presented) The cell according to claim 137 which is a prokaryotic cell.

142. (Previously presented) The cell according to claim 138 which is a prokaryotic cell.

143-144. (Cancelled)

145. (Previously presented) The cell according to claim 137 which is a plant cell.

146. (Previously presented) The cell according to claim 138 which is a plant cell.

147-148. (Cancelled)

149. (Previously presented) A plant comprising the cell according to claim 145.

150. (Previously presented) A plant comprising the cell according to claim 146.

151-152. (Cancelled)

153. (Previously presented) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 125 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

154. (Previously presented) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 126 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

155-156. (Cancelled)

157. (Previously presented) A kit comprising the protein according to claim 125.

158. (Previously presented) A kit comprising the protein according to claim 126.

159-160. (Cancelled)

161. (Previously presented) The kit according to claim 157 which further comprises luciferin.

162. (Previously presented) The kit according to claim 158 which further comprises luciferin.

163. (New) An isolated recombinant protein comprising a variant form of SEQ ID NO:38, said variant form having no more than 29 amino acids other than position 214 of SEQ ID NO:38 which are different from the amino acid sequence set forth in SEQ ID NO:38, and wherein the recombinant protein comprises a variant form of SEQ ID NO:42 wherein said variant form comprises no more than 26 amino acids other than positions 214, 215, 232 and 354 of SEQ ID NO:42 which are different from the amino acid sequence set forth in SEQ ID NO:42, and wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

164. (New) The recombinant protein of claim 163, wherein Xaa in SEQ ID NO:38 is an amino acid selected from the group consisting of Cys, Ala and Asn.

165. (New) The recombinant protein of claim 163, wherein Xaa in SEQ ID NO:38 is Ala.

166. (New) The recombinant protein of claim 163, wherein the recombinant protein comprises a variant form of SEQ ID NO:40 wherein said variant form comprises no more than 28 amino acids other than positions 214 and 354 of SEQ ID NO:40 which are different from the amino acid sequence set forth in SEQ ID NO:40.

167. (New) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 163.

168. (New) A vector comprising the nucleic acid sequence according to claim 167.

169. (New) An isolated cell transformed with the vector according to claim 168.

170. (New) The cell according to claim 169 which is a prokaryotic cell.

171. (New) The cell according to claim 169 which is a plant cell.

172. (New) A plant comprising the cell according to claim 171.

173. (New) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 163 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

174. (New) A kit comprising the protein according to claim 163.

175. (New) The kit according to claim 174 which further comprises luciferin.